

Claims

- [c1] 1. An X-ray localizer light system comprising:
a long life X-ray localizer light source;
an optical concentrator , the light source being situated at a first focal spot, the optical concentrator being configured for concentrating X-ray localizer light from the light source to a second focal spot;
an opaque shield having an aperture therein, the aperture being situated proximate to the second focal spot and being of such a geometrical shape so as to maximize light throughput while meeting light field edge contrast requirements of the X-ray localizer system.
- [c2] 2. The system of claim 1 wherein the light source comprises a halogen lamp.
- [c3] 3. The system of claim 2 wherein the halogen lamp comprises an axially positioned filament coil and wherein each dimension of the coil is smaller than a corresponding dimension of the aperture.
- [c4] 4. The system of claim 3 wherein the filament coil is wound in a helix having a length and a diameter, and wherein the length of the helix is equal to or less than about twice the diameter of the helix.
- [c5] 5. The system of claim 1 wherein the light source comprises a light source having a rated life of at least about 1000 hours.
- [c6] 6. The system of claim 5 wherein the rated life is at least about 3000 hours.
- [c7] 7. The system of claim 1 wherein the light source comprises a light source capable of withstanding repetitive switching operation in an X-ray machine environment.
- [c8] 8. The system of claim 1 wherein the light source comprises a light source having substantially similar restart and operation voltages.
- [c9] 9. The system of claim 8 wherein the restart voltage is equal to or less than about 48 volts.
- [c10] 10. The system of claim 8 wherein the restart voltage is equal to or less than

about 12 volts.

- [c11] 11. The system of claim 1 wherein the optical concentrator comprises a reflector.
- [c12] 12. The system of claim 11 wherein the reflector comprises a quasi-ellipsoidal portion, and wherein the light source is situated within the quasi-ellipsoidal portion.
- [c13] 13. The system of claim 12 wherein the reflector further comprises a cylindrical portion situated between the quasi-ellipsoidal portion and the shield for reflecting stray light from the quasi-ellipsoidal portion in the direction of the shield, a back reflector portion situated proximate to the shield, and a centrally-mounted portion situated between the aperture and the light source for directing back-reflected light in the direction of the aperture.
- [c14] 14. The system of claim 11 wherein the quasi-ellipsoidal portion comprises an elliptical portion.
- [c15] 15. The system of claim 11 wherein the light source, the reflector, and the shield are configured to provide an efficiency of light from the light source to the aperture in a range of about 10 percent.
- [c16] 16. The system of claim 11 wherein the reflector comprises a thermally conductive material coated by dichroic mirror material.
- [c17] 17. The system of claim 1 wherein the shield comprises aluminum.
- [c18] 18. The system of claim 1 wherein the aperture comprises a square aperture.
- [c19] 19. The system of claim 1 wherein the aperture comprises a polygonal aperture.
- [c20] 20. The system of claim 1 further comprising a diffuser situated between the light source and the aperture.
- [c21] 21. The system of claim 20 wherein the diffuser is attached to the shield.
- [c22] 22. The system of claim 20 wherein the diffuser comprises foggy glass.

- [c23] 23. The system of claim 20 wherein the diffuser comprises patterned glass.
- [c24] 24. A light system comprising:
a light source;
a reflector having first and second focal spots, the light source being situated at the first focal spot, the reflector being configured for concentrating light from the light source to the second focal spot;
an opaque shield having an aperture therein, the aperture being situated proximate to the second focal spot,
wherein the reflector comprises a quasi-ellipsoidal portion, wherein the light source is situated within the quasi-ellipsoidal portion, a cylindrical portion situated between the quasi-ellipsoidal portion and the shield for reflecting stray light from the quasi-ellipsoidal portion in the direction of the shield, a back reflector portion situated proximate to the shield, and a centrally-mounted portion situated between the aperture and the light source for directing back-reflected light in the direction of the aperture.
- [c25] 25. The system of claim 24 wherein the light source comprises a halogen lamp.
- [c26] 26. The system of claim 25 wherein the halogen lamp comprises an axially positioned filament coil and wherein each dimension of the coil is smaller than a corresponding dimension of the aperture.
- [c27] 27. The system of claim 26 wherein the filament coil is wound in a helix having a length and a diameter, and wherein the length of the helix is equal to or less than about twice the diameter of the helix.
- [c28] 28. The system of claim 24 wherein the quasi-ellipsoidal portion comprises an elliptical portion.
- [c29] 29. The system of claim 24 wherein the reflector comprises a thermally conductive material coated by dichroic mirror material.
- [c30] 30. The system of claim 24 wherein the shield comprises aluminum.
- [c31] 31. The system of claim 24 wherein the aperture comprises a polygonal aperture.

- [c32] 32. The system of claim 24 further comprising a diffuser situated between the light source and the aperture.
- [c33] 33. The system of claim 32 wherein the diffuser is attached to the shield.
- [c34] 34. An X-ray localizer light system comprising:
a halogen lamp;
a reflector having first and second focal spots, the lamp being situated at the first focal spot, the reflector being configured for concentrating light from the lamp to the second focal spot;
an opaque shield having an aperture therein, the aperture being situated proximate to the second focal spot and being of such a geometrical shape so as to maximize light throughput while meeting light field edge contrast requirements of the X-ray localizer system; and
a diffuser situated between the lamp and the aperture,
wherein the halogen lamp comprises an axially positioned filament coil and wherein each dimension of the coil is smaller than a corresponding dimension of the aperture.
- [c35] 35. The system of claim 34 wherein the filament coil is wound in a helix having a length and a diameter, and wherein the length of the helix is equal to or less than about twice the diameter of the helix.
- [c36] 36. The system of claim 34 wherein the reflector comprises an elliptical portion, and wherein the lamp is situated within the elliptical portion.
- [c37] 37. The system of claim 34 wherein the reflector comprises a quasi-ellipsoidal portion, and wherein the lamp is situated within the quasi-ellipsoidal portion.
- [c38] 38. The system of claim 37 wherein the reflector further comprises a cylindrical portion situated between the quasi-ellipsoidal portion and the shield for reflecting stray light from the quasi-ellipsoidal portion in the direction of the shield, a back reflector portion situated proximate to the shield, and a centrally-mounted portion situated between the aperture and the light source for directing back-reflected light in the direction of the aperture.

- [c39] 39. The system of claim 34 wherein the reflector comprises a thermally conductive material coated by dichroic mirror material.
- [c40] 40. The system of claim 34 wherein the diffuser is attached to the shield.